PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE HONORABLE BOARD OF PATENT APPEALS AND INTERFERENCES

Appellant(s):	Examiner: Brian Talbot
Yiliang Wu et al.	Art Unit: 1762
Application No.: 10/733,136	Confirmation No.: 7393
Filed: 12/11/2003	Docket No.: A3401-US-NP

Title: NANOPARTICLE DEPOSITION PROCESS

BRIEF ON APPEAL

Zosan S. Soong
Attorney for Appellant(s)
Registration No. 33,333
Telephone (585) 423-4292

Xerox Corporation
Xerox Square 20A
Rochester, New York 14644

TABLE OF CONTENTS

Page

I. REAL PARTY IN INTEREST

The real party in interest for this appeal and the present application is Xerox Corporation, by way of an Assignment recorded in the U.S. Patent and Trademark Office.

II. STATEMENT OF RELATED APPEALS AND INTERFERENCES

There are no prior or pending appeals, interferences or judicial proceedings, known to Appellant, Appellant's representative, or the Assignee, that may be related to, or which will directly affect or be directly affected by or have a bearing upon the Board's decision in the pending appeal.

III. STATUS OF CLAIMS

Claims 1-25 and 30-31 are rejected and are all on appeal.

Claims 26-29 are canceled.

IV. STATUS OF AMENDMENTS

No Amendment After Final Rejection has been filed.

V. SUMMARY OF CLAIMED SUBJECT MATTER

The invention of claim 1 is directed to a process comprising:

(a) solution depositing [page 8, paragraph [0036]] a composition comprising a liquid [page 8, paragraph [0034]] and a plurality of metal nanoparticles [page 4, paragraphs [0023] and [0024]] with a stabilizer [page 5, paragraphs [0026] and [0027]] on a substrate [page 12, paragraph 0048]] to result in a semiconductive deposited composition [page 17, paragraph [0065], lines 9-10] wherein the stabilizer is selected with a boiling point or decomposition temperature lower than about 250 degrees C under 1 atmosphere [page 5, paragraph [0026]] to result in the semiconductive deposited composition [page 17, paragraph [0065], lines 9-10]; and

(b) heating [pages 8-9, paragraph [0037]] the semiconductive deposited composition to cause the metal nanoparticles to form an electrically conductive layer [page 9, paragraph [0038]] of an electronic device [page 11, paragraph [0043]], wherein one or more of the liquid, the stabilizer, and a decomposed stabilizer is optionally part of the electrically conductive layer but if present is in a residual amount [page 10, paragraph [0040]].

The invention of claim 25 is directed to a process comprising:

(a) solution printing [page 8, paragraph [0036]] a composition comprising a liquid [page 8, paragraph [0034]] and a plurality of coinage metal containing nanoparticles [page 4, paragraphs [0023] and [0024]] with a stabilizer [page 5, paragraphs [0026] and [0027]] on a plastic substrate [page 12, paragraph 0048]] to result in a semiconductive deposited composition [page 17, paragraph [0065], lines 9-10] wherein the stabilizer is selected with a boiling point or decomposition temperature lower than about 250 degrees C under 1 atmosphere [page 5, paragraph [0026]] to result in the semiconductive deposited composition [page 17, paragraph [0065], lines 9-10]; and

(b) heating [pages 8-9, paragraph [0037]] the semiconductive deposited composition to cause the coinage metal containing nanoparticles to coalesce to form an electrically conductive layer [page 9, paragraph [0038]] of an electronic device [page 11, paragraph [0043]], wherein one or more of the liquid, the stabilizer, and a decomposed stabilizer is optionally part of the

electrically conductive layer but if present is in a residual amount [page 10, paragraph [0040]].

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

The following grounds of rejection are presented for review:

Claims 1-25, 30, and 31 are rejected as being obvious under 35 USC 103(a) over Griffith et al., US Patent 6,348,295, in combination with Heath et al., US Patent 6,103,868, or Murray et al., US Patent 6,262,129.

VII. ARGUMENT

Rejection of Claims 1-25 and 30-31 under 35 USC 103(a)

Claims 1-25 and 30-31 are not obvious under 35 USC 103(a) over Griffith et al., US Patent 6,348,295, in combination with Heath et al., US Patent 6,103,868, or Murray et al., US Patent 6,262,129.

In carrying out the present process, a semiconductive deposited composition is produced which is heated to form the electrically conductive layer. Griffith and the secondary references (Heath and Murray), separately or in combination, fail to teach or suggest a deposited composition that is semiconductive. Instead, Griffith indicates that the deposited composition is insulative (see for example column 3, lines 9-13 and 39-41, and claim 1 (b)). This insulative property is important in Griffith since the insulative capping group "physically contains the electrical characteristic and prevents interaction with neighboring particles" (column 3, lines 11-13). Moreover, the insulative property is an integral aspect of Griffith's method since the insulative property facilitates the creation of the desired electrically active pattern (column 2, lines 44-49 and claim 1). "Semiconductive" and "insulative" are art recognized terms and it is understood by those of ordinary skill in the art that "semiconductive" is fundamentally different from "insulative."

It would be inconsistent with the teachings of Griffith to have a deposited composition that has a "semiconductive" property since such a "semiconductive" property would interfere with the creation of the electrically active pattern. After all, Griffith specifically states that "the energy is applied in a desired pattern so that unexposed areas remain insulative while exposed areas exhibit the electrical behavior associated with the nanoparticles" (column 2, lines 47-49). Although Griffith indicates that the nanoparticles may be inherently conductive or semiconductive (column 3, lines 17-22), this is a statement directed to the nanoparticles themselves and not to the insulative capping group encapsulating the nanoparticles.

VIII. CONCLUSION

For all of the reasons discussed above, it is respectfully submitted that the rejection is in error and that all the appealed claims are in condition for allowance. Appellants respectfully request this Honorable Board to reverse the sole rejection at issue.

Respectfully submitted,

/Zosan S. Soong, Reg.# 33333/

Zosan S. Soong
Attorney for Appellant(s)
Registration No. 33,333
Telephone (585) 423-4292

February 28, 2007
ZSS/fsl

Xerox Corporation
Xerox Square 20A
Rochester, New York 14644

CLAIMS APPENDIX

CLAIMS INVOLVED IN THE APPEAL:

1. A process comprising:

(a) solution depositing a composition comprising a liquid and a plurality of metal nanoparticles with a stabilizer on a substrate to result in a semiconductive deposited composition wherein the stabilizer is selected with a boiling point or decomposition temperature lower than about 250 degrees C under 1 atmosphere to result in the semiconductive deposited composition; and

(b) heating the semiconductive deposited composition to cause the metal nanoparticles to form an electrically conductive layer of an electronic device, wherein one or more of the liquid, the stabilizer, and a decomposed stabilizer is optionally part of the electrically conductive layer but if present is in a residual amount.

2. The process of claim 1, wherein the stabilizer is chemically bonded to the metal nanoparticles.

3. The process of claim 1, wherein the stabilizer is physically attached to the metal nanoparticles.

4. The process of claim 1, wherein the heating causes the metal nanoparticles to coalesce to form the electrically conductive layer.

5. The process of claim 1, wherein the heating causes the metal nanoparticles to achieve particle-to-particle contact to form the electrically conductive layer.

6. The process of claim 1, wherein the metal nanoparticles consist of a single metal.

7. The process of claim 6, wherein the single metal is Al, Au, Ag, Pt, Pd, Cu, Co, In or Ni.

8. The process of claim 1, wherein the metal nanoparticles are a metal composite.

9. The process of claim 8, wherein the metal composite is Au-Ag, Au-Cu, Ag-Cu, Au-Ag-Cu, or Au-Ag-Pd.

10. The process of claim 1, wherein the metal particles are a single metal or a metal composite selected from transition metals.

11. The process of claim 1, wherein the solution depositing is accomplished by solution printing.

12. The process of claim 1, wherein the solution depositing is accomplished by solution coating.

13. The process of claim 1, wherein the metal nanoparticles have an average particle size of less than about 100 nm.

14. The process of claim 1, wherein the stabilizer is an organic stabilizer.

15. The process of claim 1, wherein the stabilizer is a thiol or an amine.

16. The process of claim 1, wherein the stabilizer is selected from the group consisting of a thiol, a dithiol, an amine, a diamine, a carboxylic acid, a carboxylate, a polyethylene glycol, a pyridine derivative, an organophosphine, and a mixture thereof.

17. The process of claim 1, wherein the substrate is flexible.

18. The process of claim 1, wherein the substrate is plastic.

19. The process of claim 1, wherein the heating is accomplished at a temperature from about 50 to about 250 degrees C.

20. The process of claim 1, wherein the heating is accomplished at a temperature from about 50 to about 150 degrees C.

21. The process of claim 1, wherein the electrically conductive layer has a conductivity of more than about 0.1 S/cm.

22. The process of claim 1, wherein the electrically conductive layer has a conductivity of more than about 100 S/cm.

23. The process of claim 1, wherein the electrically conductive layer has a conductivity of more than about 500 S/cm.

24. The process of claim 1, wherein the metal nanoparticles consists of a single metal of gold and the stabilizer is a thiol.

25. A process comprising:

(a) solution printing a composition comprising a liquid and a plurality of coinage metal containing nanoparticles with a stabilizer on a plastic substrate to result in a semiconductive deposited composition wherein the stabilizer is selected with a boiling point or

decomposition temperature lower than about 250 degrees C under 1 atmosphere to result in the semiconductive deposited composition; and

(b) heating the semiconductive deposited composition to cause the coinage metal containing nanoparticles to coalesce to form an electrically conductive layer of an electronic device, wherein one or more of the liquid, the stabilizer, and a decomposed stabilizer is optionally part of the electrically conductive layer but if present is in a residual amount.

30. A process of claim 1, wherein stabilizer is selected with a boiling point or decomposition temperature lower than about 150 degrees C under 1 atmosphere.

31. A process of claim 25, wherein stabilizer is selected with a boiling point or decomposition temperature lower than about 150 degrees C under 1 atmosphere.

EVIDENCE APPENDIX

NONE

RELATED PROCEEDINGS APPENDIX

NONE